REMARKS

The Applicants respectfully request reconsideration of this application and the entry of the claim amendments set forth above under the provisions of Section 114. Certain of the claims have been amended as set forth above and claims 1-5, 7, 9-12, 14-20, 22, 24-26, 28 and 30-34 remain in the application for reconsideration by the Examiner.

I. Rejection of Claims 1-5, 7-12, 14-18, 22-24, 28 and 31-34 under 35 U.S.C. § 112

These claims are rejected under 35 U.S.C. §112, second paragraph (related to the use of the words "steps" and "step") and are overcome by the proposed amendments to the various rejected claims (and to independent claim 19) as set forth above.

Claim 23 stands rejection under §Section 112, second paragraph as indefinite, however this rejection is now moot in view of the fact that Claim 23 has been cancelled without prejudice. It should be noted that the cancellation of this claim, as well as Claim 8, was made for the purpose of simplifying the claims at issues and not for purposes of addressing the 112 rejection.

II. Rejection of Claims 1-2, 5, 7-12, 14-20, 22-26, 28 and 30-34 under 35 U.S.C. § 103

These claims are rejected under 35 U.S.C. § 103 as unpatentable over U.S. Patent No. 4,845,043 to Catalano (Catalano) in combination with U.S. Patent Publication No. 2004/0043570 to Fujisaki (Fujisaki). Claims 3 and 4 are rejected as unpatentable over Catalano in combination with

Fujisaki and further in view of U.S. Patent No. 6,492,218 to Raaijmakers (Raaijmakers) and U.S. Patent No. 6,350,322 to Yates (Yates).

It is respectfully submitted that the asserted combination fails to establish a *prima facie* case of obviousness regarding rejected independent Claims 1 and 19, including their respective dependent claims, because the combination is improper since there is no motivation to combine their teachings, and even if proper, the combination does not teach or suggest each element of the rejected claims.

Both Catalano and Fujisaki relate to contaminant removal, and the Examiner therefore suggests that the references are combinable according to the accepted principles of combining references. But the analysis of the proprietary of the combination does not end with the recognition that both relate to contaminant removal.

The basis for combining these two references is not clear and does not appear to satisfy the *prima facie* test for reference combinations. There is no relationship between the hydrogen bake and deposition temperature of Fujisaki and the Catalano process of removing boron residual contaminants in a chamber. Moreover, Catalano does not even address hydrogen termination, and there is no need to incorporate the process of Fujisaki into Catalano. Catalano is concerned with removing contaminants from a deposition chamber and recites process temperatures related to the nitrogen trifluoride of 200 to 300°C, where as Fujisaki is directed to forming a silicon nitride layer in the presence of nitrogen gas after hydrogen evaporation at temperatures of about 560°C. Thus, the objectives and the process parameters of these two references are very different. In fact, the only common element of these processes is their use in the fabrication of semiconductor devices. One cannot combine process parameters from one process step (removing contaminants) with those of a different process (forming a silicon nitride gate film for a MOSFET). As anyone in the

semiconductor fabrication business can attest, the recipes (e.g., time, temperature, input gases) for these processes are not easily developed and must be individually and independently tailored. Thus, there is no motivation present in either reference to combine them in the way as suggested by the Examiner.

Further, even if the combination is permitted, it does not disclose the Applicants' invention as set forth in independent claims 1 and 19. There is no suggestion or teaching in Catalano of forming hydrogen termination on a surface and exposing the surface to a nitrogen-containing gas at a temperature between about 500° C and 800° C to remove contaminants from the surface. Instead, Catalano discloses using nitrogen trifluoride to remove dopant contaminants from chamber walls to avoid contamination of an intrinsic amorphous silicon layer that is to remain in an undoped condition, during a subsequent deposition process. (See, Column 2, lines 10-24, Column 3, lines 17-24, Column 4, lines 45 and 46). Moreover, the nitrogen trifluoride cleaning process disclosed in Catalano is not conducted at temperatures of about 500°C to 800°C as recited in the claims but is conducted at temperatures between 200°C and 300°C. (See, Column 5, lines 1-20).

Fujisaki does not cure the deficient teachings of Catalano. Fujisaki is directed to forming a silicon nitride film and is not directed to removing contaminants from the surface of the material layer, and the once formed hydrogen atoms are removed when the Si substrate is heated to 560° C or higher to allow the formation of the silicon nitride film.

The Applicants' claim of the formation of the hydrogen termination on the surface and over which a subsequent layer is deposited is antithetical to the Fujisaki reference whose principle objective is to reduce the hydrogen content in the silicon nitride gate film by evaporating the hydrogen from the silicon surface to break the hydrogen termination bonds (see Fujisaki Figure 5)

and allow the formation of a silicon nitride film. In contrast, Catalano's concern is removing residual gaseous products from chamber and chamber walls using low processing temperatures. As claimed, the Applicants expose the surface where the hydrogen bonds are present to a nitrogen-containing gas to remove contaminants from that surface at higher temperatures. Also, the Applicants claim a deposition step performed in the same deposition chamber as the step of exposing the surface to the nitrogen containing gas. Thus, it is respectfully submitted that the asserted combination fails to establish a *prima facie* case of obviousness because the combination fails to teach or suggest the combination of elements recited in Claims 1 and 19 and their respective dependent claims.

Regarding Claims 3 and 4, neither Raaijmakers nor Yates cure the deficient teachings of the combination of Catalano and Fujisaki, because there is no teaching in either Raaijmaker or Yates that teaches or suggests the elements of Claims 1 or 19 regarding the nitrogen gas flow and temperatures to remove contaminants from the substrate's surface.

III. Conclusion

For the foregoing reasons, applicant respectfully submits that the foregoing claims, as amended, are allowable. Therefore, a Notice of Allowance for Claims 1-5, 7, 9-12, 14-20, 22, 24-26, 28 and 30-34 is respectfully requested.

Should it facilitate allowance of the application, the Examiner is invited to telephone the undersigned attorney. The Commissioner is hereby authorized to charge any additional payment that may be due or credit any overpayment to Deposit Account No. 08-2395.

Respectfully submitted,

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